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COMDTNOTE 16121
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Subj: RESCUE 21 INTERIM PROCEDURES AND POLICIES

Ref: (a) U. S. Coast Guard Addendum to the United States National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual, COMDTINST M16130.2 (series)
(b) Telecommunications Manual (TCM), COMDTINST M2000.3 (series)

1. PURPOSE. This Notice provides interim policies and procedures for the use of the increased capabilities of the Rescue 21 Communications System.

2. ACTION. Area and district commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, Judge Advocate General, and special staff offices at Headquarters shall ensure compliance with the provisions of this Notice. Internet release is authorized.

3. DIRECTIVES AFFECTED. The procedures and policies in references (a) and (b) are amplified in this Notice. These policies will be incorporated into the above references in future changes.

4. BACKGROUND. This policy guidance was developed to assist the operational and communications unit controllers at the Sector Command Center (SCC) and Station level with employing the new capabilities of the Rescue 21 (R21) system that are not available with the current Coast Guard VHF-FM National Distress and Response System (NDRS). The Rescue 21 communications system was developed to provide the Coast Guard with the latest communications technology available to assist operational & communications unit controllers with the various missions the Coast Guard performs. Enhancements that improve the Coast Guard's communications capability include:

   a. Replacement or enhancement of Remote Fixed Facilities (RFF) or High-Level sites to provide more reliable and extended communications throughout the AOR.

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A	1	1	1	1	1	1	1		1	1		1	1	1	1	1	1		1		1					
B		8	10	1	1	1	1	1			1	1	1	10	1	1	1	1	1		1	1		1	1	
C	1	1		1	1				1				1	2	1	1	1						1		5	1
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b. The R21 system is designed to receive calls 20NM from the coastal baseline on a 1-watt radio with antenna at 2-meters above the water under optimal geographic and atmospheric conditions.

c. Additional channels are available for each RFF to allow for additional Coast Guard working channel operations.

d. Digital and Analog emissions are processed by the R21 system.

e. Digital Selective Calling (DSC) provides the ability to answer a distress alert sent via this subsystem of the Global Maritime Distress & Safety System (GMDSS).

f. Direction Finding allows radio transmissions to be identified with a line of bearing (LOB) and in some cases 2 or more LOBs will establish a position.

g. Automated broadcasting allows the watchstander to pre-record safety and information broadcasts for transmission in specified time increments.

5. DISCUSSION. The basic concepts of the VHF-FM Communications System remain the same – provide distress and safety communications for the boating public, both recreational and commercial, and provide short-range command and control communications for all Coast Guard missions. The traditional roles of the communications and operational watchstanders remain the same. R21 provides additional tools to aid in these tasks and missions, but does not alter them.

6. SAR POLICY.

a. **Watchstanding Concepts.** The tasks outlined below are R21-specific only. All the aspects of watchstander duties under the legacy NDRS remain in effect. Note: For purposes of this notice, the term "Sector" includes Groups and Sector Field Offices with Command Centers.

(1) **Sector Operational Unit Controller (OUC).** The OUC is responsible for overall management of the R21 system during the watch. The OUC will have System Administrator access to ensure continuous on-site ability to export data from the R21 system. During active R21 case activities, the OUC will focus on obtaining positional information from the system, such as identifying LOBs.

(2) **Sector Communications Unit Controller (CUC).** The CUC is responsible for coordinating radio transmissions on the system to avoid interference and duplication. During active R21 case activities, the CUC will focus on maintaining voice communications.

(3) **Station Communications.** Individual Boat Stations will coordinate with the CUC to ensure non-interference with Sector communications.

b. **Case Management.** MISLE is the primary means of Coast Guard case documentation. Exported electronic data from the R21 system shall be appended as appropriate in a format readable by non-R21 equipped units.

c. **Digital Selective Calling (DSC).** At the R21 suite an alarm will sound when a DSC alert is received. When the alert is acknowledged the alarm will stop and an acknowledgement will be visible on the DSC2 Workstation screen. The OUC or CUC that acknowledged the alert shall be responsible for executing the case or for passing the case to the responsible operations unit

controller for execution. Refer to Sections 2.2.2.3-6, 2.5.7.b, 2.2.2.8-12, 2.2.4, 2.2.5, 2.4, and 3.4.9.1 of reference (a) for additional information on DSC policy.

d. **Direction Finding.** Positional information from R21 shall be treated as any other positional information available in a SAR case. Direction Finding (DF) is a tool used to assist in identifying a possible position for the distress. Lines of Bearing (LOB) and any resulting position information may be used to establish, confirm, or refine the reported position of a distress.

(1) The system was designed with a maximum error for LOBs of ± 2 degrees and that error, regardless of distance from the RFF, shall remain constant.

(2) The direction finding receiver is a separate unit located above the communications receiver and has a separate sensitivity adjustment which may result in LOBs with no audio signal. Normally, lines of bearing without an audio signal do not require investigation. However, if the DF is tuned to monitor 121.5 MHz and an LOB results from a 121.5 MHz transmission, the source of the signal should be investigated and a search may be required. Section 3.4.4 of reference (a) provides guidance for distress beacon incidents.

(3) Although the secondary DF can be tuned to 121.5 MHz there is no requirement to provide radio guard for this frequency at our SCC's. This system capability is provided to assist the OUC with a search if the Coast Guard is notified by other sources of a 121.5 alert.

e. **Estimating Maximum Reception Distances.** If a single LOB is the only available position information for a distress case, the maximum reception distance of the distress call from the RFF must be determined. The actual effective range of each RFF is dependent on transmission strength and the RFF audio antenna height among other factors. The best information available regarding maximum possible range will be used in analysis for possible positions of a distress call. In the absence of other information, the information below will be used to determine the maximum reception distance. All Sector personnel who deal with R21 or with data from R21 should be familiar with the information, procedures and equations needed to estimate the theoretical maximum detection ranges from their RFFs, as described below.

(1) **Determining the RFF Audio Antenna Heights.** The actual height needed for computing maximum reception range for a coastal station is the height of the audio antenna above mean sea-level. For the Great Lakes, inland rivers or other areas it is the average height above the bodies of water in the area from which a distress call might reasonably come. The following considerations need to be made when determining the appropriate antenna height for use in distance computations:

(a) The tower's maximum height may be provided by the R21 vendor, but the RFF audio antenna may be several feet below the top of the tower.

(b) The actual height above ground level for each RFF audio antenna is also provided by the R21 vendor. It is important to ensure the height of the RFF audio antenna is used in distance calculations, not the height of the tower on which it is mounted.

(c) The height of the RFF audio antenna above mean sea level is found by adding the height of that antenna above ground level to the height of the tower's base above mean sea level. The height of the RFF audio antenna above an inland body of water is found by computing the antenna height above mean sea level and then subtracting the height of the surface of the body of water above mean sea level. When calculating the maximum reception range for a RFF, make sure that the correct height above mean sea-level or inland body of water is used.

(d) If a search for a 121.5 beacon is conducted then the height of the DF antenna will be used in the calculations for determining the maximum reception range for the RFF.

(2) **Estimating Search Object Antenna Heights.** The first choice is to use the probable antenna height for the distressed craft as included in the distress broadcast. For example, a sailing vessel may have an antenna mounted on the top of its mast, a commercial fishing vessel may have an antenna mounted on the top of the pilot house, etc. If the actual height is not known, then an estimate of antenna height based on type of craft should be used. If the distress alert does not mention a specific type of craft, the second choice is an antenna height for an object selection based on local knowledge of craft that typically operate in the general area of the alert. If no specific object can be selected based on local knowledge, the final choice is to use a default antenna height of 30-feet. This provides a reasonable safe estimate for the types of vessels that most often transmit VHF-FM distress calls in waters within range of Coast Guard RFFs.

(3) **Computing Theoretical Maximum Reception Ranges.** The maximum range between sending and receiving antennas is estimated using the sum of the horizon (line of "sight" for VHF-FM) distances for each of the two antennas.

(a) The horizon distance for each antenna is estimated using the following equation:

$$d = 1.23 \times \sqrt{h}$$

Where ***h*** is the antenna height above the water (e.g., mean sea level) in feet, and

d is the VHF-FM horizon distance in Nautical Miles

The total *distance* between the two antennas is therefore:

$$d_{total} = d_{sending} + d_{receiving}$$

Example: A RFF audio antenna near the ocean is 400 feet above mean sea level and the distressed craft's antenna is estimated to be 30 feet above the water. The square root of 400 is 20; when multiplied by 1.23 the resulting horizon distance is 24.6NM. The square root of 30 is 5.48; when multiplied by 1.23 the computed horizon distance is 6.7NM. Adding the two together and rounding up to the nearest whole nautical mile, the estimated maximum range from the receiving RFF to the distressed craft would be 32NM.

(b) Once the calculations are completed, each SCC should develop a table of base ranges for each RFF within that region. For example, the horizon range for each RFF would remain

constant. Adding the horizon range of a distressed craft antenna that is 6-feet, 10-feet, 15-feet, etc. above the water would create a quick reference for watchstanders.

(c) The formula the Coast Guard uses for RFF range is for radio line of sight. The distances calculated will not correspond exactly with those produced by C2PC or table H-41 in reference (a); the distances produced by these sources are based on the visual line of sight formula which uses a constant of 1.17 instead of 1.23. Values from either of these visual line of sight sources may be multiplied by 1.05 to find the radio line of sight.

f. **Uncorrelated Distress Broadcasts & Alerts.** For uncorrelated distress broadcasts the provisions of section 3.4.9 in reference (a) shall be followed and in particular the direction given in section 3.4.9.5 in regards to reasonable search area. Methods for determining the search area to be considered for both correlated and uncorrelated distress alerts are described in the following paragraphs.

g. **Search Planning.** There may be insufficient information available to determine the position of a distress transmission within close limits. It is also prudent to have a search plan available for situations where the SRU arrives on scene but cannot immediately locate the distressed craft or persons. The following paragraphs provide guidance on how to plan an initial search, based on the type and amount of information available for estimating the position of the distress call.

(1) **Distress Alerts with no LOB.** If a distress alert is received but a LOB cannot be accurately determined, it will be necessary to estimate the general location based on an estimate of the maximum range of the distressed craft from the receiving RFF antenna(s). Once the distance from a receiving RFF to the distressed craft has been computed, an arc of that radius, centered on the RFF position, may be drawn. Generally, the area defined by the arc and the shoreline adjacent to the intended R21 coverage area is the potential search area when only one RFF receives the signal. However, if there are other bodies of water within the computed radius (i.e. inshore bays, rivers, etc.), the possibility of the distressed craft being in one of those locations should be considered.

(a) If it can be confirmed that the distress alert was received on more than one RFF, the maximum range to the distressed craft from each RFF should be computed and appropriate arcs should be plotted. Either C2PC SAR Tools or paper charts and compasses may be used to plot the arcs. The overlap area common to all of the plotted arcs should contain the distressed craft. A rectangle enclosing this overlap area should be plotted and searched with a coverage of not less than 1.0. If the SRU cannot arrive on scene before drift becomes a significant factor (i.e. when the combination of drift factors would move the search object outside the area effectively searched), the search area should be drifted.

(b) If the search object type cannot be otherwise determined, use the default type (20-foot power boat) for estimating sweep width and coverage factor.

(2) **Determining Search Areas for a Single LOB.** A single LOB from a VHF-FM transmission will generally provide sufficient information to plan and carry out a search. In this situation, the search area is determined by two factors: the estimated maximum distance to the

distressed craft, which is used for the length of the area, and the application of R21's maximum 2-degree error to either side of the LOB, which is used to find the width. These may be calculated either using C2PC/SAR Tools or manually.

(a) **Manual Calculations:**

1. **Determining Search Area Length.** Calculate the distance from the receiving RFF to the distressed craft by using the procedure and equations in paragraph 6.e.(3)(a) above for estimating maximum reception ranges.

2. **Determining Search Area Width.** The width of the area to be searched is calculated using simple geometry for triangles.

   a. Using the line of sight distance calculated above and applying the ± 2 degrees of error in the equation below produces the width of the initial search area.

   $$W = 2 \times d \times \sin(\theta)$$

   Where ***W*** is the width of the search area in Nautical Miles,

   d is the line of sight distance in Nautical Miles, and

   θ is the DF error angle; for R21 this is 2º

   Example: If the line of sight distance is the 32 NM (from example above); then the width of the search area would be 2 x 32 NM x sin(2º) (approx. 0.034899) or 2.2 NM.

   b. The small DF error angle for R21 significantly limits the width of the search area. For example, the distance from a distress craft transmitting from a 50-foot high antenna to a receiving RFF antenna of 1000-feet is only 47 NM, and the resulting width of the area is just under 4 NM. These antenna heights represent the high end of what will exist for the R21 RFF's and most distress craft.

   c. Radio waves follow great circles, not rhumb lines. Rhumb lines plot as straight lines on charts that use the Mercator projection. The C2PC/SAR Tools display and virtually all nautical charts use the Mercator projection. Great circles plot as curves on these charts. The difference between the great circle bearing shown by R21 and the rhumb line connecting the distressed craft with the RFF on a Mercator chart is usually negligible within the maximum reception range of most R21 RFFs. The higher the latitude and the larger the difference in the longitudes of the distressed craft and the RFF, the larger the difference between these bearings. Plotting the R21 LOB as a rhumb line on a Mercator chart may place it slightly north (in the northern hemisphere) of the great circle on which the distressed craft is positioned. If the LOB extended to the maximum theoretical reception range spans more than one degree of longitude, consideration should be given to increasing the width of the search area by one or two tracks to the right or left of the LOB (whichever is in a southward direction) in order to compensate for the difference between great circle and rhumb line bearings.

(b) **C2PC/SAR Tools:**

1. C2PC/SAR Tools provides an easy means to plot a line of bearing based on height of eye of observer (RFF audio antenna height) and search object (distress craft antenna height) with associated bearing error. C2PC/SAR Tools also allows the user to choose to plot the great circle bearing which eliminates the need to apply any corrections to the bearing as detailed above. A correction to the length of the area must be applied however when using C2PC/SAR Tools to compensate for the difference between line of sight for radio versus visual.

2. In C2PC/SAR Tools the Range/Bearing Line tool is used. It is accessed via the button on the tool bar or via the menu "Edit – Quick Overlays – New – Range/Bearing Lines." The entries are the same information used in the manual method above with the addition of choosing the type of line. Data entries are as follows:

   a. **Mode:** Direction/Range.

   b. **Connect Type:** Great Circle.

   c. **Start Position:** Enter the latitude/longitude of the RFF or use the selection tool.

   d. **Bearing:** Input bearing of R21 LOB.

   e. **Bearing Error:** For R21 use 2 DEG.

   f. **Observer Height:** Enter height of RFF audio antenna.

   g. **Object Height:** Enter height of distress craft antenna per paragraph 6.e.(2) above.

3. An example of the appropriate entries and the resulting plot on C2PC is shown in Figure 1 below. Note the distance shown is the visual line of sight, this number should be increased by 5% (multiply by 1.05) to find the radio line of sight.

(c) **Positioning the Initial Search Area.** The rectangular area just calculated is centered on the LOB and oriented in the same direction so that it extends from the RFF to the estimated maximum range. If C2PC/SAR tools was used to calculate and directly plot the LOB, then the rectangular area should be extended so that its length is 1.05 (5% greater) times the length of the LOB. This is the initial search area. Once it has been defined then those areas that overlap the maximum reception range of an RFF that did not receive the distress alert, if any, may be eliminated. Other regions subject to possible elimination may include land, any areas where the RFF is known to be "blind," if any, etc.

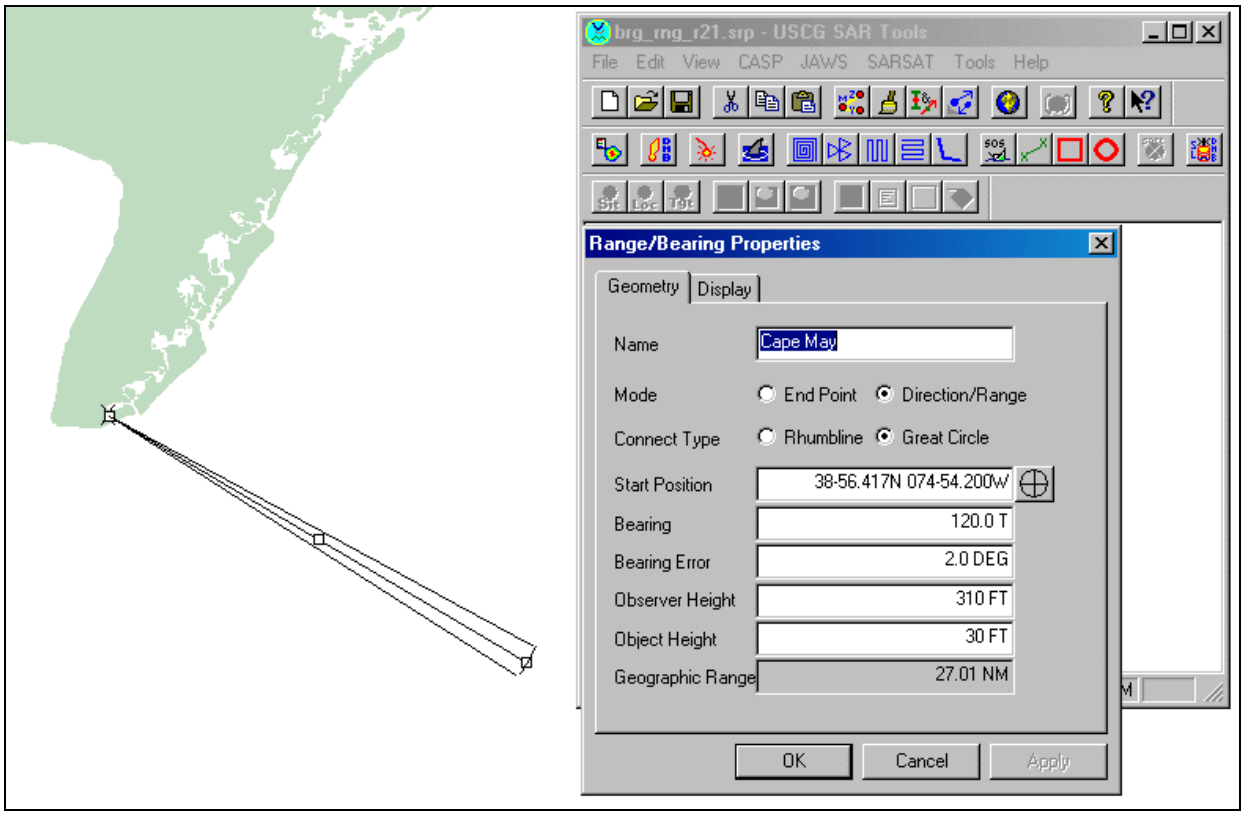

Figure 1 – C2PC/SAR Tools Range and Bearing Plot

(d) **Searching.** The initial search area computed in accordance with the steps given above shall be searched with a coverage factor of no less than 1.0, provided the SRU arrives before drift has become a significant factor. At a minimum, the initial search effort for this area shall consist of at least two search legs with a track spacing equal to one-half of the search area width, provided this will meet the coverage requirement of 1.0 or greater. In this case, the two legs will be parallel to the LOB and offset from it on either side by one-fourth of the search area's width. If a search object type cannot be otherwise determined, the default search object type (20-foot power boat) shall be used for sweep width and coverage factor determinations.

(e) **Search Pattern.** Because the widths of the resulting single LOB areas are relatively narrow, most searches for a single LOB can be conducted using a Trackline Single-unit Return (TSR) or equivalent PS pattern having two search legs. For example, the daylight visual sweep width for the default search object for an uncorrelated distress (20-foot powerboat) is 4.3 NM for a helicopter searching at 500-feet with 10 NM visibility, while it is 3.3 NM for a small boat SRU under the same conditions. With these sweep width values, two search legs will easily meet the coverage requirement for either SRU type.

(3) **Determining Search Areas for Multiple LOBs.** When it can be confirmed that simultaneous or nearly simultaneous LOBs from multiple RFFs are based on signals from the same transmitter that is broadcasting a distress alert, a fix on the transmitter's location can be obtained, within the ±2º bearing error of R21. This generally results in a small search area.

Plot each LOB and lines represent the ±2º bearing error of R21 for each LOB. These lines may be plotted with C2PC/SAR Tools as described above. The area enclosed by the intersecting ±2º bearing error lines is the area that should contain the search object as of the time of the distress broadcast. Center a square or circle on this area that is sufficiently large to contain it. This is the initial search area. Plan an expanding square (SS) or sector (VS) search pattern that achieves a coverage factor of at least 1.0. If a single VS search does not provide a coverage factor of 1.0, a second search should be conducted as described in section 2.4.2.6(b)(1) of reference (a). If the search area size and/or dimensions are such that a different search pattern would be more appropriate, e.g. a parallel (PS) search pattern, then the other pattern should be employed for the initial search.

(a) **Calculating coverage factor for a Sector (VS) search.** The coverage (***C***) for a six-sector VS pattern of radius (and leg length) ***R*** may be estimated by:

$$C = \frac{2.86 \times W}{R}$$

where ***W*** is the sweep width.

(b) **Multiple non-crossing LOB's with nearly reciprocal bearings.** The search areas for each LOB should be calculated separately. The maximum calculated distance for each LOB should provide the minimum for the other LOB. (See Figure 2 below) These separate areas should be enclosed by a single rectangle to form the area to be searched.

(c) **Multiple divergent LOB's to a single RFF.** There may be incidents where an RFF picks up a bounce or skip transmission that provides an erroneous LOB while another picks up the actual signal with and accurate LOB coming from significantly different directions. Each LOB should be considered individually. Emphasis should be given to the most logical LOB first. Local knowledge may provide clues as to potential for bounce or other anomalies.

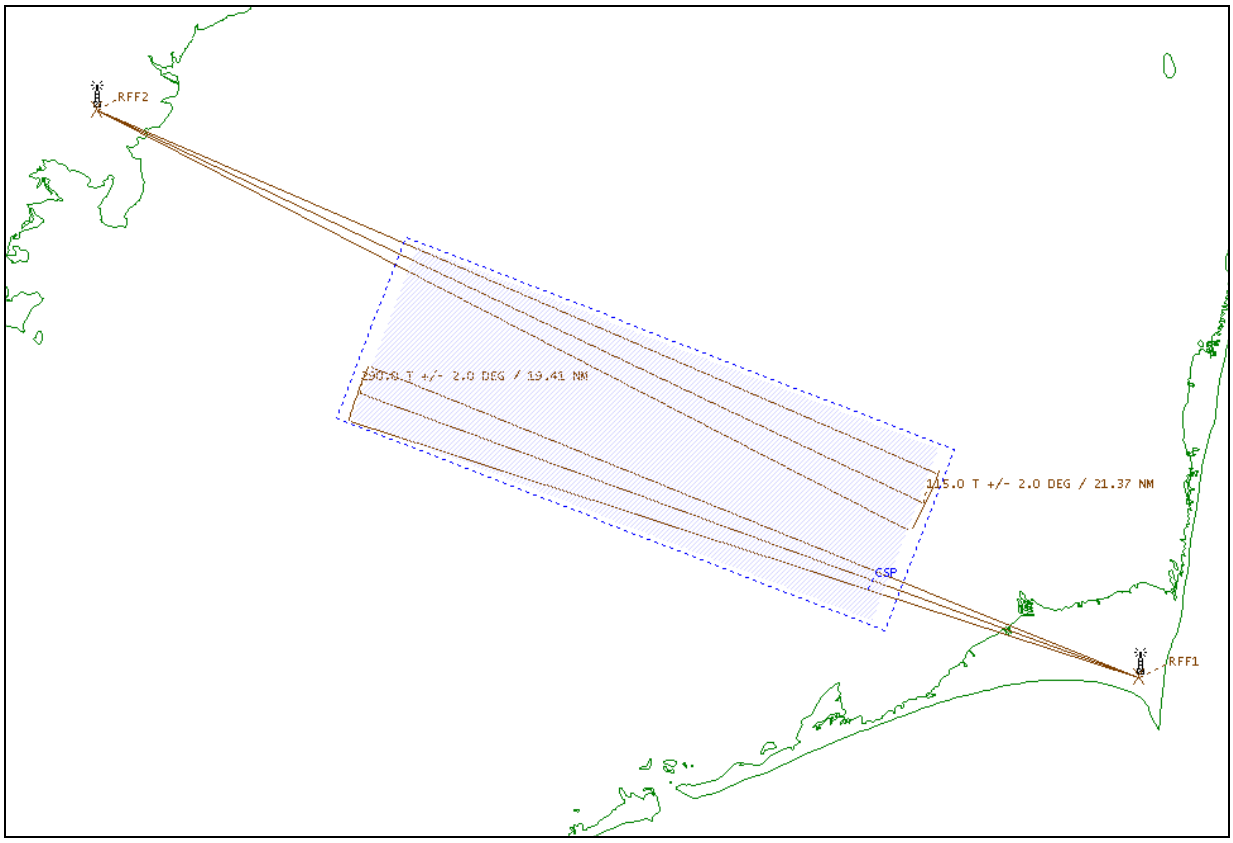

Figure 2 – Determining a Search Area for Non-Crossing LOB's With Nearly Reciprocal Bearings. (Exaggerated for purposes of illustration)

(4) **Other Factors Affecting Estimation of a Distressed Craft's Location.**

(a) Both maximum reception range arcs and LOBs may be used together to estimate the location of a distress transmission, provided it can be confirmed that all are correlated with the same distress alert.

(b) If the initial search area cannot be covered before drift becomes a significant factor, a new search area that accounts for drift between the time of the distress alert and the time at which the SRU can be on scene must be computed in accordance with standard search planning procedures. See the *International Aeronautical Search and Rescue (IAMSAR) Manual*, the *National Search and Rescue Supplement (NSS)* thereto, and Chapter 3 and Appendix H, of the CGADD.

(c) Occasionally, atmospheric conditions cause "ducting" of VHF-FM signals. When this happens, the range at which these signals can be received becomes greatly extended. "Ducting" is often detected by hearing normal, non-distress traffic with information content indicating the transmitting craft are far away. For example, an RFF near Tampa, Florida, might "hear" traffic between a merchant vessel and a Mississippi River pilot-a distance of several hundred nautical miles.

(d) Because of its high frequency, VHF-FM is more susceptible to reflection from large tall structures than MF or HF signals. In some cases, this could affect the DF results such that the indicated direction points toward a structure rather than toward the distressed craft.

(e) As with all distress incidents, efforts to synthesize all of the available data from all sources to form one or a few self-consistent pictures ("scenarios") of the situation should be aggressively pursued. Although R21's capabilities will be very helpful, it is but one of potentially many sources of information bearing on a given case.

h. **Geo Display.** The Geo Display visually displays the SCCs AOR. Displayed on this screen are lines of bearing (LOB), fixes, SCCs, RFFs, Stations, etc.

(1) The LOBs are displayed when the selected channel(s) for DF are keyed by a VHF-FM radio.

(2) The length of decay shall be determined in the SCC SOP.

(3) If there are 2 LOBs that correspond to a vessel in distress but are unable to intersect because the distance for intersection is greater than 20NM then the OUC/CUC shall associate the LOBs on the screen to identify the caller's approximate position. The steps to perform this process are located in the System Operator's Manual, Volume IB and must be provided in a QRC at the operational/communications unit controller positions.

(a) The present Geo display is not a conformal chart system, so caution must be used in that the plotted LOBs will have some apparent inaccuracies. For example, at 40N latitude, a bearing of 045T plots on the R21 display at an angle of 52.5 degrees from the vertical direction (north). The R21 textual displays of bearings in degrees are accurate, however.

(b) Caution should also be used in correlating an LOB with a voice transmission. The time stamp on an LOB can vary up to 6 seconds due to a processing delay. The voice transmission is time stamped at the start of the transmission and the LOB is time stamped at the end of the transmission.

7. R21 SYSTEM COMMUNICATIONS.

a. **System Configuration.** Standard and consistent system configuration is essential. For each Sector, the Sector Commander shall identify and designate 2 individuals as System Administrators who will set the standards for any optional setups in the different R21 Managers for the Sector and its Stations. These will not be adjusted by individual watchstanders except as authorized by the Sector Commander or his/her designated appointee..

b. **Levels of Access.** Within the R21 system there are levels of access granted to a user. The system administrator will have full accessibility to assign these functions. The Sector Commander must ensure a system administrator is available at all times to export data from the system. The SCC command may designate additional personnel to have system administration access. This access should be limited to fully qualified R21 controllers. Reference the R21 Technical Manual, Vol.1 Pt. B Chapters 1 (1.3) & 13 (13.3.2) for general guidance.

c. **Legacy and R21 Communications Systems Operational Guidance.** During the interim period where the NDRS and R21 are operating in tandem, watchstanders shall use all available tools from both systems, as required, to communicate with and locate a distressed caller. In the event that the two systems provide conflicting data that cannot be resolved, both data sets shall be used for case analysis in search planning. Note: Until the R21 system at each Sector is accepted and the legacy NDRS system is shut down, both R21 and legacy Channel 16 guard capabilities will be maintained and monitored to ensure coverage.

d. **Initial Log-in Screen Set-up.** At a minimum, upon login to the system, the following screens must be opened and kept open at all times. However, how an OUC/CUC chooses to view these screens, displayed or minimized, is a personal choice.

(1) Geo Display
(2) Audio Manager
(3) System Manager
(4) DSC Manager

e. **Log-Off Procedures.** During watch relief at those units with distress frequency guard requirements, at least one computer shall be operational so that the system, i.e. radio, can be constantly monitored.

f. **Logs.** Standard supervisor abbreviated radio logs are acceptable and encouraged as both the R21 and legacy systems have recording capabilities. If the recording systems fail, a complete Radio log must be maintained until the system is restored. All communications are to be logged by the Sector CUC or Station Communications Watch as with the legacy system. The R21 incorporated log will not be utilized. R21's Incident Manager Function is not to be used at this time.

g. **Digital Selective Calling (DSC).** At a minimum the following columns on the DSC panel shall be active.

(1) Call Time
(2) Station (RFF on which the call was received)
(3) RQI (Strength of the received signal)
(4) Format (Individual, multi, All Ships)
(5) Category (Urgency, Routine, etc.)
(6) TeleCmd1 – Right click on the column and select **position**. Position shall be checked at all times.
(7) From (MMSI number)

(8) From Country
(9) Nature (Nature of Distress)
(10) Position
(11) Receiving Frequency
(12) Transmitting Frequency

h. **Geo Display.** The Geo Display visually displays the SCCs AOR. Displayed on this screen are lines of bearing (LOB), fixes, SCCs, RFFs, Stations, etc. The LOBs are displayed when the selected channel(s) for DF are keyed by a VHF-FM radio. The length of decay shall be determined in the SCC SOP. At a minimum, upon start up of the Geo Display, the following layers must be checked (if available).

(1) Rescue 21
(2) USCG AOR
(3) LAT/Long Grid (5x5)

i. **Additional Available Channels.** Each RFF site has six channels, reference (a) section 2.5.7 for table. One is dedicated to Channel 16 voice, one is dedicated to Channel 70 data, and one is for UHF. The remaining three channels at each site shall be assigned by the OUC from channels which have been previously authorized.

j. **Archive Tapes.** Personnel access to the Bright Stor (playback archives) shall be determined by the Configuration Control Board.

(1) Tapes should be rotated every seven days.

(2) All tapes shall be retained for at least 30 days.

(3) If a tape contains transmissions of a significant case, mark the tape with the case name, dates and times the communications took place and set aside pending the completion of review, litigation, investigation etc.

(4) Requirements for storage of archive tapes:

(a) Keep tapes in their plastic containers when not in the M1500.

(b) Keep the tapes in humidity and temperature controlled environment. If the archive environment is substantially different than the M1500, allow a reasonable acclimation period before loading.

(c) Tape quality must be checked before reusing. Assure that the tape is not damaged i.e., wrinkled, burnt, stretched, etc.

k. **System Alerts.** System Alerts alert the Customer Care Center (CCC) that there is something wrong with the R21 equipment.

(1) The CCC will manage system problems and notify the region that is affected and provide the affected SCC an estimated time of repair.

(2) If the CCC notifies the SCC that an RFF has been identified with a communications problem then the Operations/Communications Unit Controller shall notify the MLC, District and other commands of the RFF malfunction per the SCC SOP/Annex K.

(3) Operators can view system status by reviewing the System Manager panel, which displays the current status of SCC's, RFF's and Stations equipment and communications capabilities.

(4) At a minimum, the following system alerts shall be active in the System Alerts panel. Additional guidance may be provided in Annex K or SCC SOP.

(a) Asset Tracking Failure (when available)
(b) Asset Failed to Report (when available)
(c) RFF Status Update
(d) Station Status Update
(e) SCC Status Update
(f) RFF Intrusion

l. **System Maintenance.** In the event a piece of R21 equipment should malfunction and the CCC has not acknowledged the alert, the following steps shall be followed:

(1) **Shore equipment.** The operational or communications unit controller shall call the CCC. The CCC will then call the General Dynamics regional representative to pick up, deliver and install the replacement equipment. **Note:** Once the SCC operational unit controller has notified the CCC, the controller shall continue with the notifications procedures outlined in current policy as well as i.e. CASREPS, etc. Additionally, Station unit operators shall notify the CCC and SCC of any hardware equipment casualty and shall continue with the notifications procedures outlined in current policy, i.e. CASREPS.

(2) **Vessel equipment.** The station personnel shall notify the ESD. The ESD will notify the CCC but will also work in conjunction with the General Dynamics field representative to trouble shoot the problem and if determined it is a hardware problem then the field representative will pick up and deliver the replacement equipment for installation by the ESD. **Note**: Once the station notifies ESD the unit shall continue with the notification procedures outlined in current policy as well as i.e. CASREPS, etc.

m. **Asset Tracking or Blue Force Tracking.** This capability in R21 is only available for Rescue 21 equipped vessels. The CUC shall continue with current policy for communications checks with Coast Guard assets and is not responsible for manually tracking the asset on the Geo Display.

n. **Automated Broadcasting.** Broadcast formats and contents remain the same. It is only how the broadcast is sent that will change.

(1) The communications unit controller has three options of sending out a broadcast.

(a) Select a channel & RFF and transmit.
(b) Record a voice broadcast.

(c) Type a broadcast for the voice synthesizer.

(2) The communications unit controller shall replay all recorded or synthesized broadcasts prior to the first transmission to ensure that the message is clear and that all the words are pronounced correctly and clearly.

(3) All broadcasts shall be logged as prescribed in paragraph 7f.

(4) Certain types of broadcast information require simultaneous broadcasting on all RFFs to ensure the entire AOR is covered. This policy remains in effect under the new R21 system. However, using this broadcast method with new R21 technology and capability may produce varying levels of echoing and signal distortion. It is expected that the levels of echoing and signal distortion will be minimal. However, if units experience a significant degradation of service to the maritime public, as a result of using the simultaneous method of broadcasting, the specific incidents should be documented and a report sent via chain of command to CG-62.

o. **Direction Finding Channels.** Direction Finding is permanently assigned to channel 16. One other channel can be selected for DF capability, i.e. the Coast Guard working channel an asset is using. The secondary DF capability does not need to be activated if not needed, which will reduce the number of LOBs on the Geo Display. Additionally, the secondary DF antenna can be quite useful when trying to locate a distressed boater that is on an alternate frequency that the voice communications system cannot access. The secondary DF can also locate transmissions on 121.5 provided it is within the line of sight.

p. **Direction Finding (DF) Accuracy Testing.** The accuracy testing of individual RFFs DF system shall be conducted every 12 hours with an adjacent RFF to assure that the LOBs are within ±2º of error. If there is no adjacent RFF within range then a DF accuracy test shall be conducted with a Coast Guard asset that provides DGPS coordinates once per day when possible.

q. **Recording and Immediate Playback.** All communications within the R21 system are recorded and are available for immediate playback.

(1) If a received transmission is garbled or inaudible then the operational/communications unit controller should utilize the R21 band pass filter to omit some of the white noise heard in a transmission and/or manipulate the speed of the transmission to further clarify the call.

(2) If the transmission is still unreadable then the operational unit controller shall extract the .wav files onto a USB key and input the transmission into the Goldwave system for additional clarity.

8. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental considerations were examined in the development of this Notice and have been determined to be not applicable.

9. FORMS/REPORTS. None.

W. E. JUSTICE /s/
Director of Enforcement and Incident Management